
Recent Progress in Developing Injectable Matrices for Enhancing Cell Delivery and Tissue Regeneration.

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Public Summary:

Biomaterials are key factors in regenerative medicine. Matrices used for cell delivery are especially important, as they provide support to transplanted cells that is essential for promoting cell survival, retention, and desirable phenotypes. Injectable matrices have become promising and attractive due to their minimum invasiveness and ease of use. Conventional injectable matrices mostly use hydrogel precursor solutions that form solid, cell-laden hydrogel scaffolds in situ. However, these materials are associated with challenges in biocompatibility, shear-induced cell death, lack of control over cellular phenotype, lack of macroporosity and remodeling, and relatively weak mechanical strength. This Progress Report provides a brief overview of recent progress in developing injectable matrices to overcome the limitations of conventional in situ hydrogels. Biocompatible chemistry and shear-thinning hydrogels have been introduced to promote cell survival and retention. Emerging investigations of the effects of matrix properties on cellular function in 3D provide important guidelines for promoting desirable cellular phenotypes. Moreover, several novel approaches are combining injectability with macroporosity to achieve macroporous, injectable matrices for cell delivery.

Scientific Abstract:

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